

REMARKS

Claims 5, 18, 26-33 have been canceled. Claims claims 1, 2, 7, 16 and 19 have been amended and the specification has been amended to include a serial number and filing date. Claims 34-38 have been added. Subsequent to the entry of the present amendment, claims 15-17, 19-20, 29-30 and 34-37, 42-52 are pending and at issue. These amendments add no new matter as the claim language is fully supported by the specification and original claims.

I. Rejections under 35 U.S.C. §112, Second Paragraph

Claims 7-12 are rejected under 35 U.S.C. §112, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicant respectfully traverses this rejection.

The Office Action points out that in claim 7 the term "the coatings" does not have clear and proper antecedent basis in the claims and that it appears that claim 7 should depend on claim 6.

Applicants have amended claim 7 to properly depend on claim 6, which includes the term "coatings". There is now antecedent basis for claim 7. Accordingly, Applicant respectfully requests that the rejection of claims 7-12 under 35 U.S.C. §112 be withdrawn.

II. Rejections under 35 U.S.C. §102

A. Claims 1-4, 6-17 and 19-25 are rejected under 35 U.S.C. §102(e) as allegedly anticipated by Beebe et al. (U.S. Patent 6,488,872 B1). Applicant respectfully traverses this rejection.

A rejection of claims under 35 U.S.C. § 102 is improper unless each and every element of the claimed subject matter is found, either expressly or inherently described, in a single prior art reference (Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 (Fed. Cir. 1987); MPEP § 2131).

The Office Action alleges that "Beebe et al (see the entire document, in particular, col. 7, line 55 to col. 8, line 7; col. 8, line 66 to col. 9, line 35; col. 10, line 5 to col. 12, line 52) teach a process of making a structure attached to a microfluidic channel using hydrodynamic focusing, and also teach a process including steps of introducing a polymerizable fluid and a focusing fluid into a hydrodynamic focusing system, hydrodynamically focusing the polymerizable fluid and forming a structure in the hydrodynamic focusing system by polymerizing the polymerizable fluid as claimed."

Applicant asserts that the Beebe et al. does not include each and every element of the claimed subject matter. As discussed below, the structures in Beebe et al. that are attached to a channel (such as the polymeric sensor/actuator) are not formed using hydrodynamic focusing, and the structures that are formed using hydrodynamic focusing (such as the thread) are not attached to the channel. Therefore, Beebe et al. does not disclose a "method comprising forming a structure attached to a micro-fluidic channel based on hydrodynamic focusing using a hydrodynamically focused fluid and a focusing fluid."

The present invention is directed to forming a structure attached to a micro-fluidic channel based on hydrodynamic focusing using a hydrodynamically focused fluid and a focusing fluid. Beebe et al. discloses microfabricated devices and methods of manufacturing the devices (Beebe, Abstract). The microfabricated devices of Beebe et al. includes channels. It would be these types of channels to which the present invention attaches a structure by hydrodynamic focusing. Looking closer at Beebe et al., and closely reviewing the sections cited in the Office Action, it will become apparent that Beebe et al. does not include each and every element of the claimed subject matter.

The first cited section in Beebe et al., col. 7, line 55 to col. 8, line 7, discloses a formation of a polymeric sensor/actuator at a preselected location in a channel using a polymerizable mixture, in this case a gel. An anchoring monomer may be adhered to a surface of the channel and is threaded into the polymer gel. Portions of the polymerizable mixture is polymerized and a

mask is used to avoid polymerization outside the selected area. It is clear that this embodiment of Beebe et al. does not use hydrodynamic focusing in forming the structure attached to the channel wall and does not use a hydrodynamically focused fluid and a focusing fluid.

The second cited section in Beebe et al., col. 8, line 66 to col. 9, line 35, discloses the manufacture of a device in a cartridge filled with a polymerizable mixture exposed to UV light. Portions of the polymerizable mixture is polymerized and a photomask positioned in the top surface of the cartridge determines the geometry of the structural components and microchannels. Again, this embodiment of Beebe et al. does not include hydrodynamic focusing in forming the structure attached to the channel wall and does not use a hydrodynamically focused fluid and a focusing fluid.

The third cited section in Beebe et al., col. 10, line 5 to col. 12, line 52, discusses the construction of a device structure and components. Many of these again include the use of masks. In one embodiment, a first polymerizable mixture is used to create the device walls using an optical mask and later use a different polymerizable mixture to create functional components (Beebe, col. 10, lines 39-54). This embodiment of Beebe et al. does not include hydrodynamic focusing in forming the structure attached to the channel wall and does not use a hydrodynamically focused fluid and a focusing fluid.

The third cited section in Beebe et al. also discloses embodiments for three-dimensional functional devices. In one embodiment, hydrodynamic focusing is discussed to continuously manufacture small diameter polymeric threads using a polymerizable mixture and inert liquid (Beebe, col. 11, line 66 to col. 12, line 28). Nowhere in this embodiment is it disclosed that the small diameter polymeric threads are attached to the channel wall, the threads are formed in the middle of the channel. Another embodiment is disclosed that uses laminar flow without photomasks to fabricate a pH valve having "functional walls" that are formed along the walls of a channel and can be used to regulate flow based on the pH of passing fluid through the channel (Beebe, col. 12, lines 29-52). There is no disclosure of attaching the "functional walls" to the

channel wall, or using hydrodynamic focusing with a hydrodynamically focused fluid and a focusing fluid.

Therefore, for at least the reasons set forth above, Beebe et al. fails to teach each and every element of the claimed subject matter. Accordingly, Applicants submit that the claimed invention would not have been anticipated by Beebe et al. and, therefore, respectfully request that the rejection of the claims under 35 U.S.C. §102(e) be withdrawn.

B. Claims 1, 2 and 6-15 are rejected under 35 U.S.C. §102(b) as allegedly anticipated by Kenis et al. ("Fabrication Inside Microchannels Using Fluid Flow"). Applicant respectfully traverses this rejection.

The Office Action alleges that "Kenis et al (see entire document, in particular, page 842, second column, part III to page 843, first column; page 844, second column (Area-Selective Crystal Growth")) teach a process of making a structure attached to a microfluidic channel using hydrodynamic focusing as claimed."

The first cited passage in Kenis et al., page 842, second column, part III to page 843, first column, discloses fabrication inside microchannels using a single stream of liquid. The liquid may coat the inner surface. There is no disclosure of forming a structure attached to the microchannel, nor disclosure of forming a structure based on hydrodynamic focusing using a hydrodynamically focused fluid and a focusing fluid.

The second cited passage in Kenis et al., page 844, second column (Area-Selective Crystal Growth"), discloses a localized nucleation and growth of crystals inside a microchannel. There is no disclosure of forming a structure attached to a micro-fluidic channel based on hydrodynamic focusing, or using a hydrodynamically focused fluid and a focusing fluid.

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Therefore, for at least the reasons set forth above Kenis et al. fails to teach each and every element of the claimed subject matter. Accordingly, Applicants submit that the claimed invention would not have been anticipated by Kenis et al. and, therefore, respectfully request that the rejection of the claims under 35 U.S.C. §102(b) be withdrawn.

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III. Conclusion

In view of the amendments and above remarks, it is submitted that the claims are in condition for allowance, and a notice to that effect is respectfully requested. The Examiner is invited to contact Applicant's undersigned representative if there are any questions relating to this application.

Check number 580536 in the amount of \$120.00 is enclosed as payment for the One-Month Extension of Time fee. No other fee is deemed necessary with the filing of this paper. However if any additional fees are due, the Commissioner is hereby authorized to charge any fees, or make any credits, to Deposit Account No. 07-1896 referencing the above-identified attorney docket number. A copy of the Transmittal Sheet is enclosed.

Respectfully submitted,

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Michael R. Shevlin
Registration No.: 38,724
Telephone: (858) 677-1456
Facsimile: (858) 677-1465

DLA PIPER RUDNICK GRAY CARY US LLP.
ATTORNEYS FOR INTEL CORPORATION
4365 Executive Drive, Suite 1100
San Diego, California 92121-2133
Customer No.: 28213